

What is claimed is:

1. An operational amplifier in which a differential amplifier circuit equipped with a current mirror circuit is incorporated, the operational amplifier comprising:

5 a first switch connected to a portion between an inversion input terminal and a non-inversion input terminal of the differential amplifier circuit;

a second switch connected to a portion between an output terminal of the operational amplifier and the inversion input  
10 terminal, the second switch controlling conductive state and non-conductive state contrary to the first switch;

a differential pair input circuit in which a current path terminal for a first transistor and a current path terminal for a second transistor are connected to a first current terminal  
15 and a second current terminal of the current mirror, respectively;

a third switch connected to a portion between a gate of the first transistor and an output terminal of the operational amplifier, the third switch being set in conductive state while  
20 the first switch is in conductive state and being set in non-conductive state while the first switch is in non-conductive state;

a first capacitor connected to a portion between a gate of the first transistor and predetermined voltage;

25 a fourth switch connected to a portion between a gate of the second transistor and the output terminal of the operational amplifier, the fourth switch being set in conductive state for a predetermined length of period while the second switch is in conductive state; and

30 a second capacitor connected to a portion between a gate

of the second transistor and predetermined voltage,

wherein the operational amplifier has offset cancel function.

5 2. A line driver for amplifying at least one input signal(s) by each input of the input signal every output period that appears repeatedly, the line driver including operational amplifier(s) allocated to respective input signals for amplifying the input signals, each of the operational  
10 amplifier(s) being equipped with a differential amplifier circuit in which a current mirror circuit is incorporated,

wherein each of the operational amplifier(s) comprises:

a first switch connected to a portion between an inversion input terminal and a non-inversion input terminal of the  
15 differential amplifier circuit;

a second switch connected to a portion between an output terminal of the operational amplifier and the inversion input terminal, the second switch controlling conductive state and non-conductive state contrary to the first switch;

20 a differential pair input circuit in which a current path terminal for a first transistor and a current path terminal for a second transistor are connected to a first current terminal and a second current terminal of the current mirror, respectively;

25 a third switch connected to a portion between a gate of the first transistor and an output terminal of the operational amplifier, the third switch being set in conductive state while the first switch is in conductive state and being set in non-conductive state while the first switch is in non-conductive  
30 state;

a first capacitor connected to a portion between a gate of the first transistor and predetermined voltage;

a fourth switch connected to a portion between a gate of the second transistor and the output terminal of the operational amplifier, the fourth switch being set in conductive state for a predetermined length of period while the second switch is in conductive state; and

a second capacitor connected to a portion between a gate of the second transistor and predetermined voltage, and

wherein the line driver has offset cancel function.

3. A liquid crystal display device for applying an image data voltage signal through plural data lines every horizontal period that appears repeatedly, the liquid crystal display device including operational amplifier(s) allocated to respective image data voltage signals for amplifying the input signals, each of the operational amplifier(s) being equipped with a differential amplifier circuit in which a current mirror circuit is incorporated,

wherein each of the operational amplifier(s) comprises:

a first switch connected to a portion between an inversion input terminal and a non-inversion input terminal of the differential amplifier circuit;

a second switch connected to a portion between an output terminal of the operational amplifier and the inversion input terminal, the second switch controlling conductive state and non-conductive state contrary to the first switch;

a differential pair input circuit in which a current path terminal for a first transistor and a current path terminal for a second transistor are connected to a first current terminal

and a second current terminal of the current mirror,  
respectively;

a third switch connected to a portion between a gate of  
the first transistor and an output terminal of the operational  
5 amplifier, the third switch being set in conductive state while  
the first switch is in conductive state and being set in non-  
conductive state while the first switch is in non-conductive  
state;

a first capacitor connected to a portion between a gate of  
10 the first transistor and predetermined voltage;

a fourth switch connected to a portion between a gate of the  
second transistor and the output terminal of the operational  
amplifier, the fourth switch being set in conductive state for a  
predetermined length of period while the second switch is in  
15 conductive state; and

a second capacitor connected to a portion between a gate  
of the second transistor and predetermined voltage, and

wherein the liquid crystal display device has offset  
cancel function.

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4. An operational amplifier in which a differential amplifier  
circuit equipped with a current mirror circuit is incorporated,  
the operational amplifier comprising:

a first switch connected to a portion between an inversion input  
25 terminal and a non-inversion input terminal of the differential  
amplifier circuit;

a second switch connected to a portion between an output  
terminal of the operational amplifier and the inversion input  
terminal, the second switch controlling conductive state and  
30 non-conductive state contrary to the first switch;

a differential pair input circuit in which a current path terminal for a first transistor and a current path terminal for a second transistor are connected to a first current terminal and a second current terminal of the current mirror, respectively;

a third switch connected to a portion between a gate of the first transistor and an output terminal of the operational amplifier, the third switch being set in conductive state while the first switch is in conductive state and being set in non-conductive state while the first switch is in non-conductive state;

a first capacitor connected to a portion between a gate of the first transistor and predetermined voltage;

a fifth switch connected to a portion between a gate of the second transistor and the non-inversion input terminal, the fifth switch being set in conductive state for a predetermined length of period while the second switch is in conductive state; and

a second capacitor connected to a portion between a gate of the second transistor and predetermined voltage,

wherein the operational amplifier has offset cancel function.

5. A line driver for amplifying at least one input signal(s) by each input of the input signal every output period that appears repeatedly, the line driver including operational amplifier(s) allocated to respective input signals for amplifying the input signals, each of the operational amplifier(s) being equipped with a differential amplifier circuit in which a current mirror circuit is incorporated,

wherein each of the operational amplifier(s) comprises:

a second switch connected to a portion between an output terminal of the operational amplifier and the inversion input terminal, the second switch controlling conductive state and

5 non-conductive state contrary to the first switch;

a differential pair input circuit in which a current path terminal for a first transistor and a current path terminal for a second transistor are connected to a first current terminal and a second current terminal of the current mirror,

10 respectively;

a third switch connected to a portion between a gate of the first transistor and an output terminal of the operational amplifier, the third switch being set in conductive state while the first switch is in conductive state and being set in non-  
15 conductive state while the first switch is in non-conductive state;

a first capacitor connected to a portion between a gate of the first transistor and predetermined voltage;

a fifth switch connected to a portion between a gate of  
20 the second transistor and the non-inversion input terminal, the fifth switch being set in conductive state for a predetermined length of period while the second switch is in conductive state; and

a second capacitor connected to a portion between a gate  
25 of the second transistor and predetermined voltage, and

wherein the line driver has offset cancel function.

6. A liquid crystal display device for applying an image data voltage signal through plural data lines every horizontal period  
30 that appears repeatedly, the liquid crystal display device

including operational amplifier(s) allocated to respective image data voltage signals for amplifying the input signals, each of the operational amplifier(s) being equipped with a differential amplifier circuit in which a current mirror circuit is  
5 incorporated,

wherein each of the operational amplifier(s) comprises:

a first switch connected to a portion between an inversion input terminal and a non-inversion input terminal of the differential amplifier circuit;

10 a second switch connected to a portion between an output terminal of the operational amplifier and the inversion input terminal, the second switch controlling conductive state and non-conductive state contrary to the first switch;

a differential pair input circuit in which a current path  
15 terminal for a first transistor and a current path terminal for a second transistor are connected to a first current terminal and a second current terminal of the current mirror, respectively;

a third switch connected to a portion between a gate of  
20 the first transistor and an output terminal of the operational amplifier, the third switch being set in conductive state while the first switch is in conductive state and being set in non-conductive state while the first switch is in non-conductive state;

25 a first capacitor connected to a portion between a gate of the first transistor and predetermined voltage;

a fifth switch connected to a portion between a gate of the second transistor and the non-inversion input terminal, the fifth switch being set in conductive state for a predetermined  
30 length of period while the second switch is in conductive state;

and

a second capacitor connected to a portion between a gate of the second transistor and predetermined voltage, and

wherein the liquid crystal display device has offset  
5 cancel function.

7. A line driver for amplifying at least one input signal(s) by each input of the input signal every output period that appears repeatedly, the line driver comprising:

10 operational amplifier for amplifying the input signal(s) number of which is larger by at least one than number of the input signal(s); and

a switch section for selecting and switching to operational amplifiers in amplification operation by receiving  
15 inputs of the input signals, the switch section switching every output period,

wherein offset cancellation is made on operational amplifier(s) not selected during the output period.

20 8. A line driver according to claim 7 further comprising:

operational amplifiers for amplifying the input signal(s) number of which is larger by one than number of the input signal(s); and

switch sections, provided for adjoining every two of the  
25 operational amplifiers, the switch section selecting one of the two operational amplifiers,

wherein offset cancellation is made on a non-selected operational amplifier to which the input signal is not inputted, and adjoining switch sections are switched in order every output  
30 period.

9. A liquid crystal display device for applying an image data voltage signal through plural data lines every horizontal period that appears repeatedly, the liquid crystal display device

5 comprising:

operational amplifiers for amplifying the input signals number of which is larger by at least one than number of the input signal(s); and

10 a switch section for selecting and switching operational amplifiers in amplification operation by receiving inputs of the input signals, the switch section switching every output period, wherein offset cancellation is made on operational amplifier(s) not selected during the output period.

15 10. An offset cancel circuit alternately conducting offset voltage fetch operation in which an offset value of an operational amplifier is fetched as differential voltage with respect to reference voltage and offset voltage cancel operation in which differential voltage is cancel out from output voltage,

20 wherein, as reference voltage to be used in the offset voltage fetch operation, either input voltage prior to the offset voltage fetching operation or output voltage after offset voltage cancel operation prior to the offset voltage fetching operation is used.

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